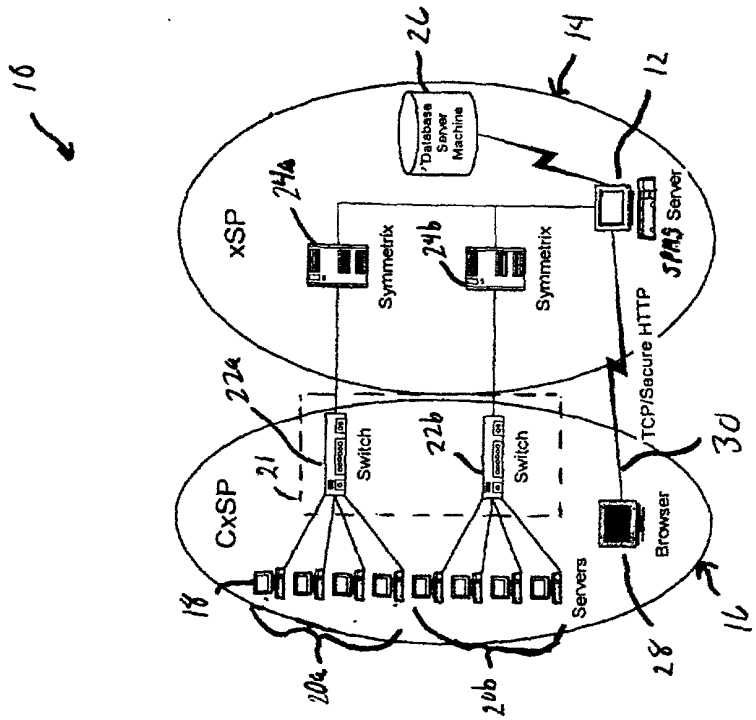
16
26
14
12
Database Server Machine
xSP
24a
24b
Symmetrix
Symmetrix
SRM Server
TCP/Secure HTTP
22a
22b
21
Switch
Switch
30
CxSP
Browser
18
Servers
16
28
20a
20b

FIG. 1

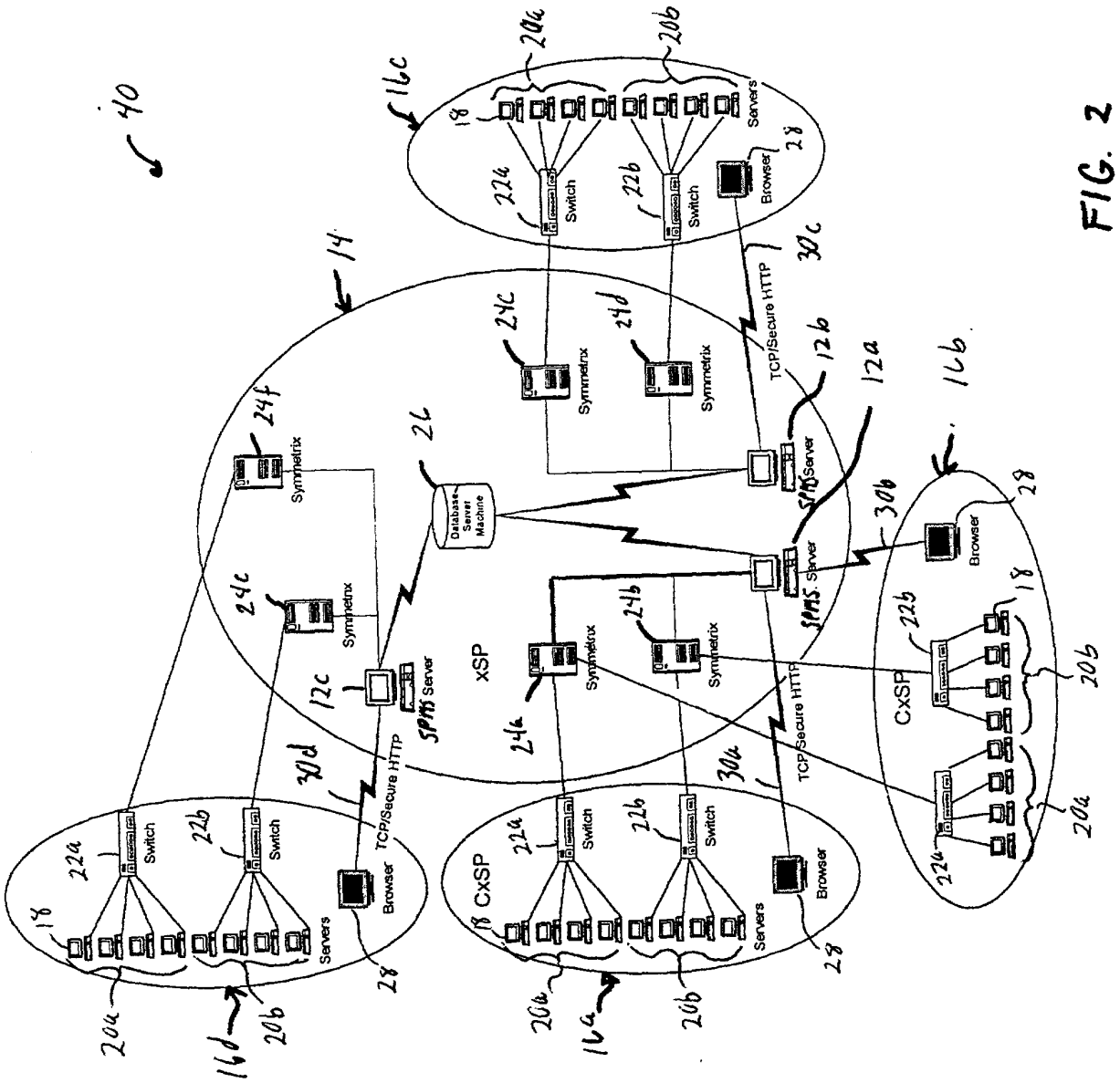
40
14
16a
16b
16c
16d
12a
12c
18
20a
20b
22a
22b
24a
24b
24c
24d
24f
26
28
30a
30b
30c
30d
Symmetrix
Database Server Machine
SMS Server
Switch
Servers
Browser
xSP
CxSP
TCP/Secure HTTP

FIG. 2

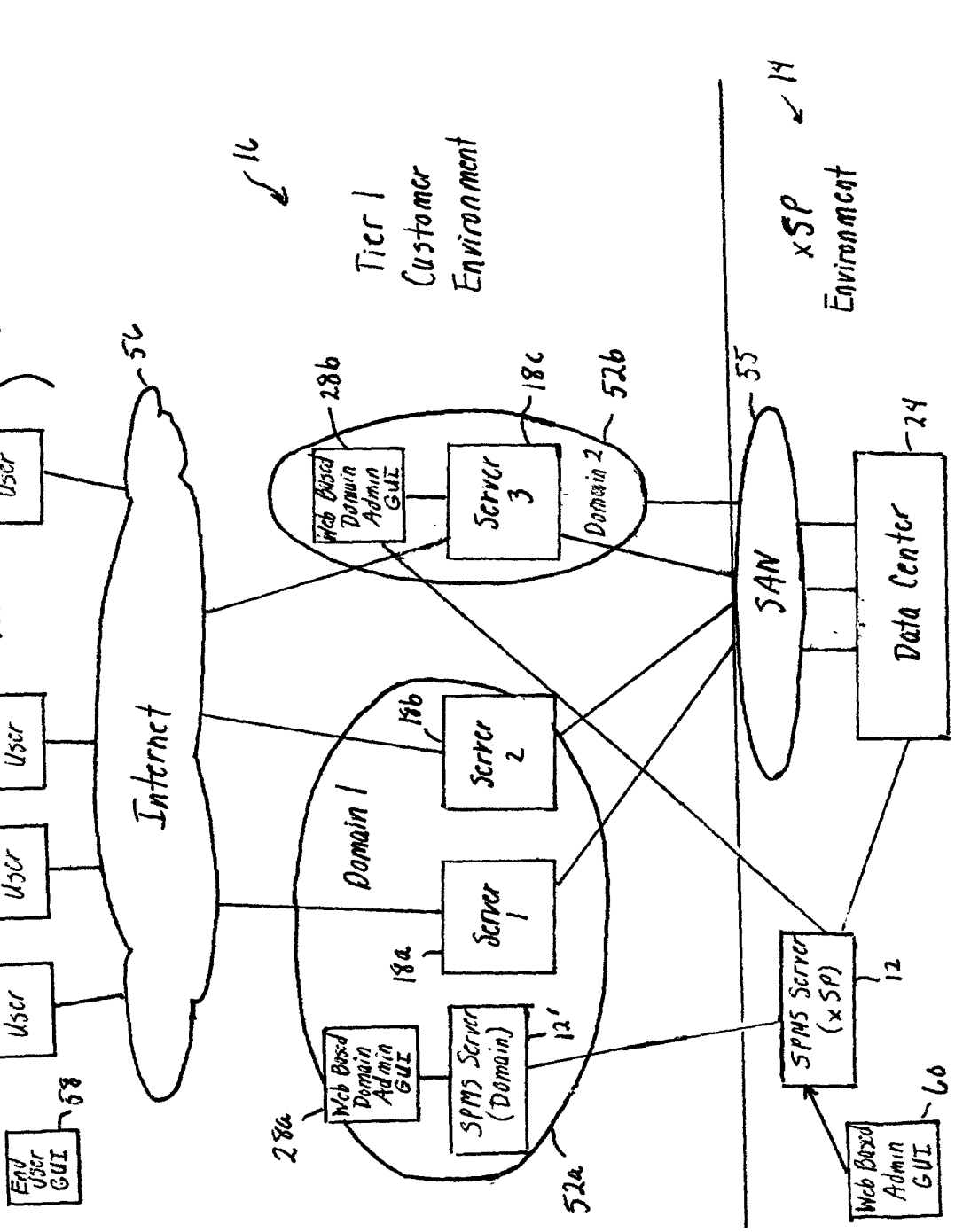
50
16
Tier 1 Customer Environment
14
xSP Environment
54
54a
54b
54c
54k
End User
End User GUI
58
56
Internet
Domain 1
18a
Server 1
18b
Server 2
18c
Server 3
Domain 2
52a
52b
28a
28b
Web Based Domain Admin GUI
SPMS Server (Domain)
12'
SPMS Server (xSP)
12
55
SAN
24
Data Center
60
Web Based Admin GUI

FIG. 3

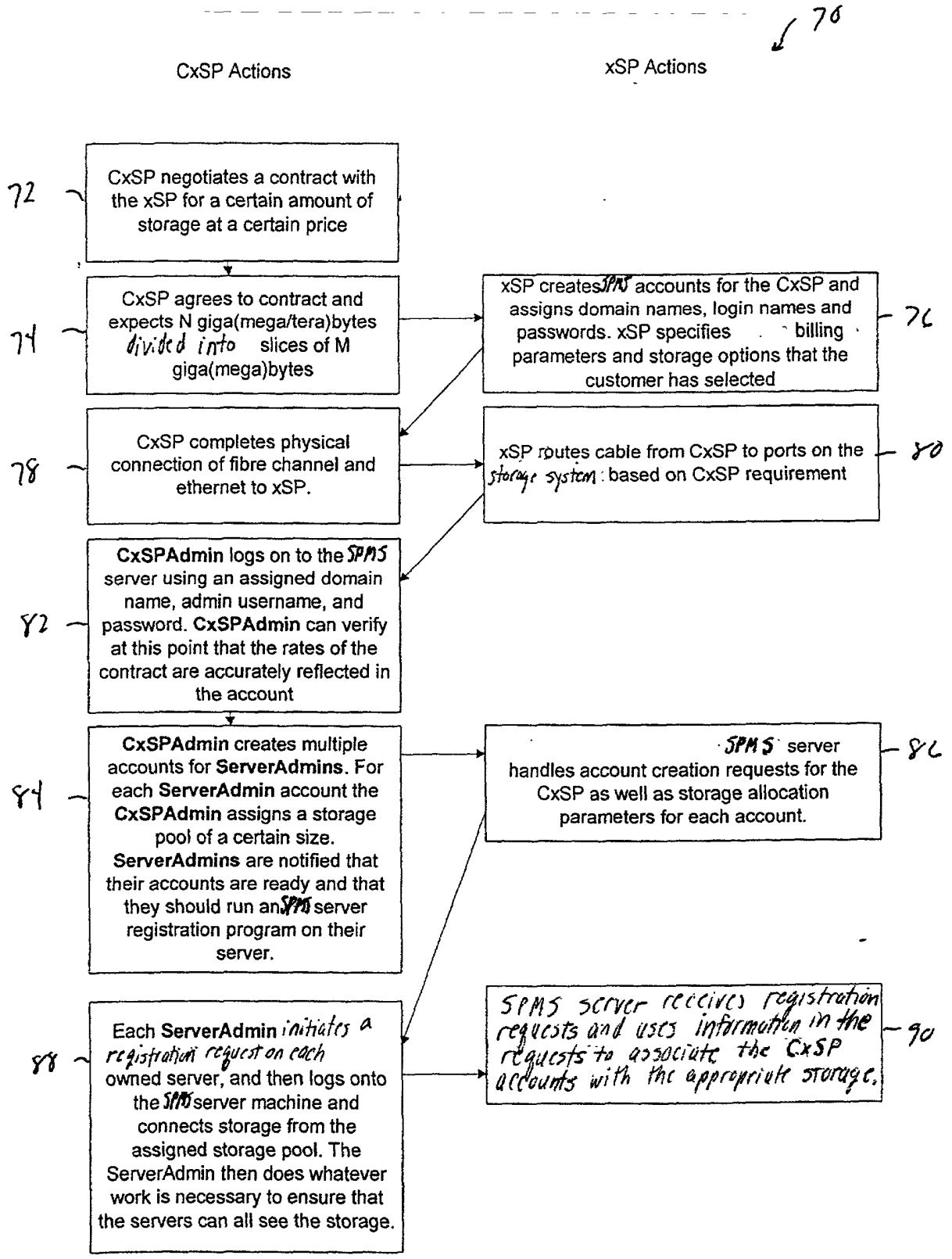
76
CxSP Actions
xSP Actions
72
CxSP negotiates a contract with the xSP for a certain amount of storage at a certain price
74
CxSP agrees to contract and expects N giga(mega/tera)bytes divided into slices of M giga(mega)bytes
xSP creates SPMS accounts for the CxSP and assigns domain names, login names and passwords. xSP specifies billing parameters and storage options that the customer has selected
78
CxSP completes physical connection of fibre channel and ethernet to xSP.
xSP routes cable from CxSP to ports on the storage system based on CxSP requirement
82
CxSPAdmin logs on to the SPMS server using an assigned domain name, admin username, and password. CxSPAdmin can verify at this point that the rates of the contract are accurately reflected in the account
84
CxSPAdmin creates multiple accounts for ServerAdmins. For each ServerAdmin account the CxSPAdmin assigns a storage pool of a certain size. ServerAdmins are notified that their accounts are ready and that they should run an SPMS server registration program on their server.
SPMS server handles account creation requests for the CxSP as well as storage allocation parameters for each account.
88
Each ServerAdmin initiates a registration request on each owned server, and then logs onto the SPMS server machine and connects storage from the assigned storage pool. The ServerAdmin then does whatever work is necessary to ensure that the servers can all see the storage.
SPMS server receives registration requests and uses information in the requests to associate the CxSP accounts with the appropriate storage.

FIG. 4

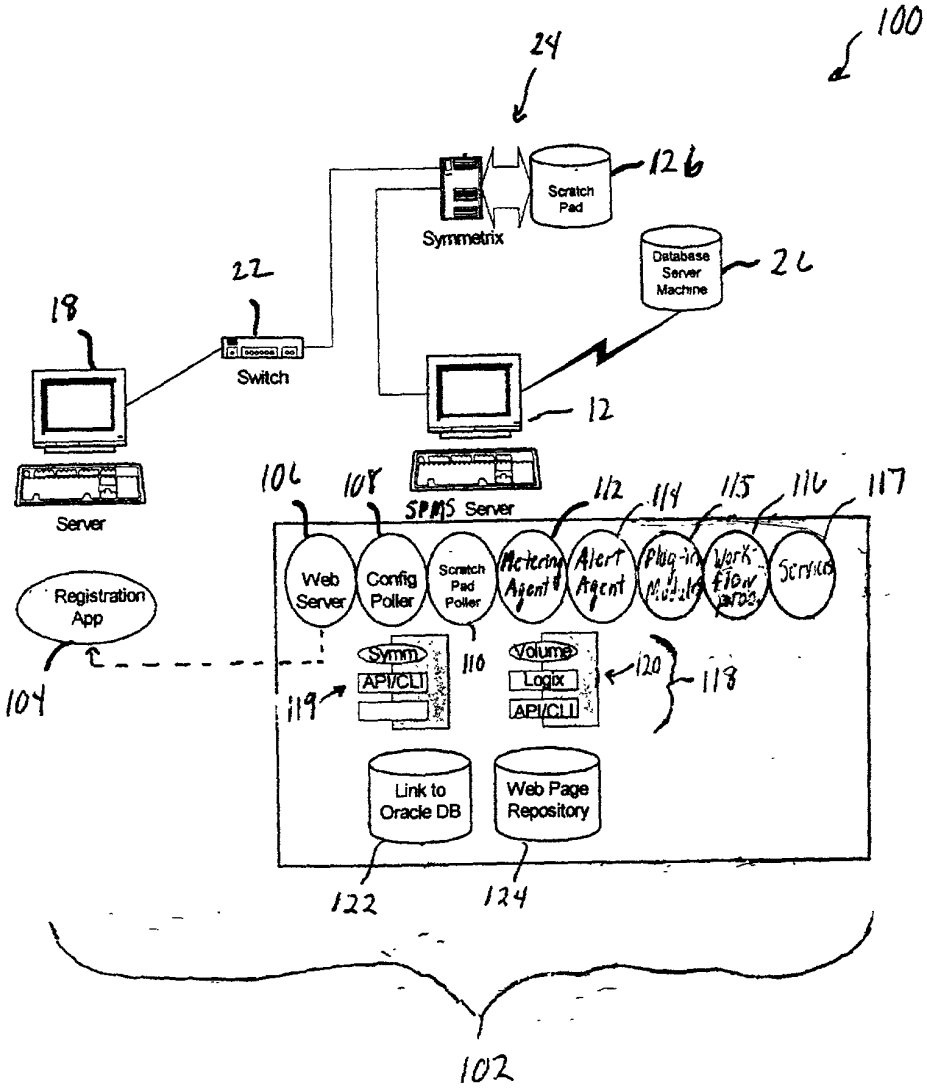
100
24
126
Scratch Pad
Symmetrix
Database Server Machine
26
22
18
Switch
12
Server
106
108
SPMS Server
112
114
115
116
117
Web Server
Config Poller
Scratch Pad Poller
Metering Agent
Alert Agent
Plug-in Module
Work Flow Mgr
Service
Registration App
104
Symm
API/CLI
110
Volume
Logix
API/CLI
120
118
119
Link to Oracle DB
Web Page Repository
122
124
102

FIG. 5

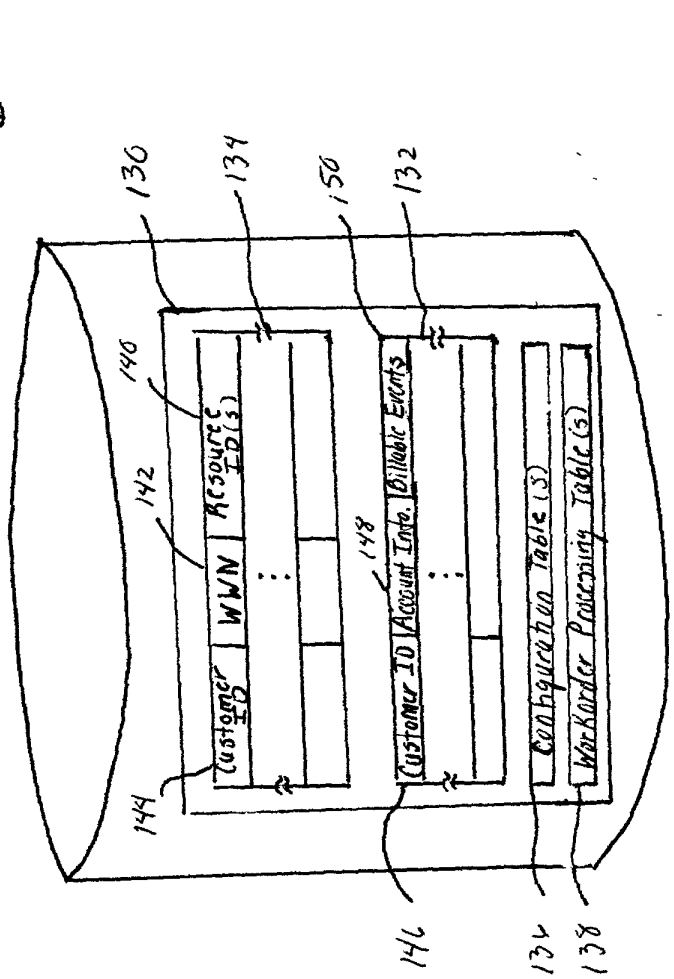
26
130
134
150
132
140
142
148
144
Customer ID
WWN
Resource ID(s)
Customer ID
Account Info.
Billable Events
Configuration Table(s)
Workorder Processing Table(s)
146
136
138

FIG. 6

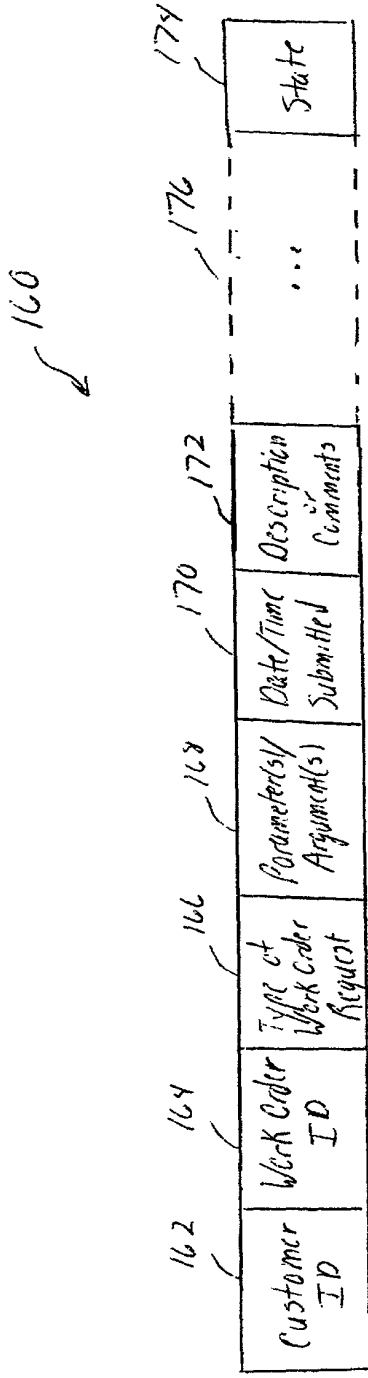
160
162
164
166
168
170
172
174
176
Customer ID
Work Order ID
Type of Work Order Request
Parameter(s)/ Argument(s)
Date/Time Submitted
Description / Comments
State
...

FIG. 7

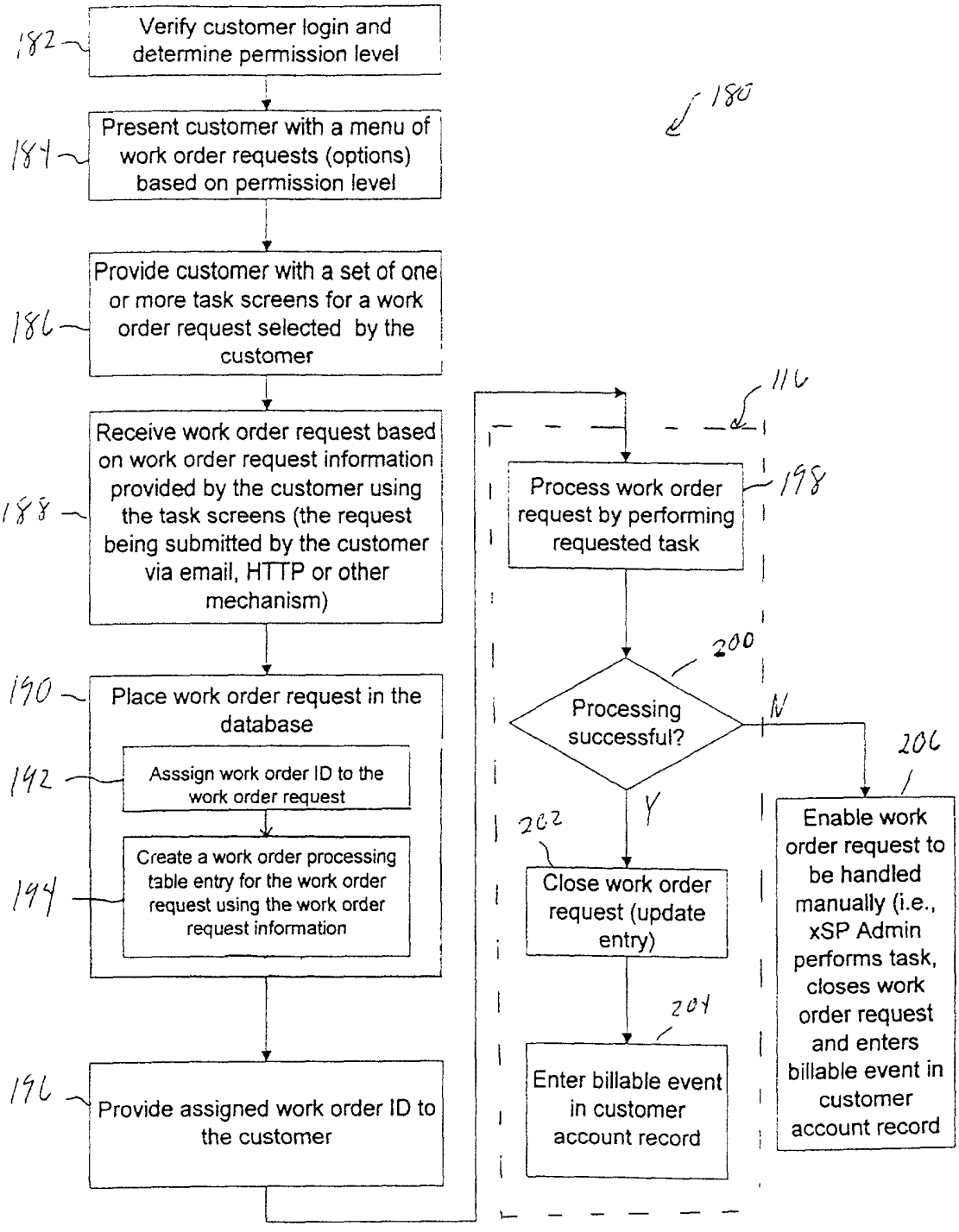
180
182
Verify customer login and determine permission level
184
Present customer with a menu of work order requests (options) based on permission level
186
Provide customer with a set of one or more task screens for a work order request selected by the customer
188
Receive work order request based on work order request information provided by the customer using the task screens (the request being submitted by the customer via email, HTTP or other mechanism)
190
Place work order request in the database
192
Asssign work order ID to the work order request
194
Create a work order processing table entry for the work order request using the work order request information
196
Provide assigned work order ID to the customer
116
198
Process work order request by performing requested task
200
Processing successful?
N
206
Enable work order request to be handled manually (i.e., xSP Admin performs task, closes work order request and enters billable event in customer account record
Y
202
Close work order request (update entry)
204
Enter billable event in customer account record

FIG. 8